First Use Date: October 20, 2006

DEPARTMENT OF TRANSPORTATION

STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 208—Embankments

Delete Section 208 and substitute the following:

208.1 General Description

This work includes placing embankments, backfilling structures, and constructing earth berms and surcharges with suitable material excavated under Section 204, Section 205, Section 206, and Section 207.

Complete the work according to the lines, grades, and typical cross- sections shown on the Plans or established by the Engineer.

The work also includes preparing areas by backfilling stump holes and correcting surface irregularities where the embankment is to be constructed. This includes forming, compacting, and maintaining the embankment and placing and compacting approved material where unsuitable material has been removed.

Payment for this work is included in other appropriate Pay Items unless a specific Pay Item is set up in the Contract.

Apply all provisions of Section 161 to the work in this Section.

Perform Shoulder Construction according to Section 216.

208.1.01 Definitions

General Provisions 101 through 150.

208.1.02 Related References

A. Standard Specifications

Section 161—Control of Soil Erosion and Sedimentation

Section 201—Clearing and Grubbing Right-of-Way

Section 204—Channel Excavation

Section 205—Roadway Excavation

Section 206—Borrow Excavation

Section 207—Excavation and Backfill for Minor Structures

Section 209—Subgrade Construction

Section 216—Unpaved Shoulders

Section 810—Roadway Materials

Section 811—Rock Embankment

Section 813—Pond Sand

B. Referenced Documents

GDT 7

GDT 20

GDT 21

GDT 24a

GDT 24b

GDT 59

GDT 67

208.1.03 Submittals

General Provisions 101 through 150.

208.2 Materials

Embankment material classes are defined in Section 810, Section 811, and Section 813. The material incorporated into the roadway will be subject to the following limitations:

A. Embankment Material

Use embankment material classified as Class I, II, III, V, or VI except as noted below:

1. Inundated Embankments

   A Special Provision in the Proposal will contain required gradation and other characteristics of materials for constructing embankments through reservoirs.

2. Intermittently Inundated Embankments

   Build intermittently inundated embankments using any material suitable for embankment.

3. Embankments at Structures

   Embankment materials placed within 10 ft (3 m) of any bridge structure shall be classified as Class I or II. Ensure that materials do not contain rock larger than 3 in (75 mm) for any dimensions.

B. Rock Embankment

Ensure that rock embankment placed as indicated on the Plans meets the requirements of Section 811 unless specified otherwise in the Plans or in the Special Provisions.

C. In-Place Embankment

Construct in-place embankment with Class I, II, III, V, or VI material.

D. Backfill Material

Backfill material furnished and stockpiled shall be Class I or Class II as defined in Subsection 810.2.01.A.

E. Pond Sand Embankment

Use pond sand that meets the requirements of Section 813 as embankment material. Material is subject to the following approval limitations:

1. Pond sand will be approved on a stockpile basis only.
2. Pond Sand will not be approved for Type I or normal backfill materials or for backfill for mechanically stabilized walls.
3. Pond sand shall be encapsulated, when used as fill, with 2 ft (600 mm) of soil on the slopes and 3 ft (1 m) of soil on top.
4. Pond sand shall not be used on sidehill fills or fill widenings where any of the following conditions exist:
    a. The proposed fill slope is steeper than 2:1.
    b. The thickness of the proposed fill at its thinnest point, as measured perpendicularly from the new fill line to the existing ground slope/fill slope, is less than 7 ft (2.1 m), including 2 ft (600 mm) of soil cover.
    c. The fill height exceeds 30 ft (9 m).

208.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

208.3 Construction Requirements

208.3.01 Personnel

General Provisions 101 through 150.

208.3.02 Equipment

General Provisions 101 through 150.

208.3.03 Preparation

General Provisions 101 through 150.

208.3.04 Fabrication

General Provisions 101 through 150.

208.3.05 Construction

A. Benching Excavation for Embankment

This work includes excavating material forming benches in the existing ground beneath proposed embankments. Form benches to increase the bond between the existing ground and the proposed embankment.

This work is required where embankments are placed on hillsides or against existing embankments, which will be indicated on the Plans.

Construct the benches approximately 12 ft (3.7 m) wide unless otherwise shown on the Plans. Use material removed in the excavation in the embankments. The Department will make no additional payment for this work.

B. Embankments

Follow these requirements when constructing embankments:

1. Preparation for Embankments

   Before starting embankment construction, clear and grub the embankment area according to Section 201 and install Drainage Structures according to Section 550.

   a. Depressions and Undercut Areas

      Fill depressions below the ground surface and undercut areas with suitable material. Remove unsuitable or unstable material and compact according to Subsection 208.3.05.B.1.c before beginning embankment construction.

   b. Scarification and Other Preparation

      Plow and scarify the entire area upon which the embankment is to be placed (except inundated areas) at least 6 in (150 mm) deep.

      Before placing the embankment, recompact loosened soil to the approximate density of the underlying soil. Cut benches as specified in Subsection 208.3.05.A.

   c. Compaction Under Shallow Fills

      When the depth of fill and surfacing is 3 ft (1 m) or less, compact the original ground compact at least 1 ft (300 mm) deep to at least 95 percent of the maximum laboratory dry density as determined from representative samples of the compacted material using, GDT 7, GDT 24a, GDT 24b, or GDT 67whichever applies.

      The in-place density of the compacted fill will be determined according to GDT 20, GDT 21, or GDT 59, whichever applies.

   d. Embankments Over Existing Roads, Parking Areas, and Floors

      Thoroughly plow or scarify all portions of existing unpaved roads and flexible pavements. Destroy cleavage planes before placing the embankment.

      1) Remove the old pavement with rigid surfaces if the new embankment is not more than 3 ft (1 m) high.

      2) Break remaining rigid pavements that are within 10 ft (3 m) of the finished grade so that no section larger than 10 ft^2 (1 m^2) remains intact.

2. Embankment Formation

   Use the following requirements when constructing the embankment formation:

   a. Layer Construction

Except as noted in Subsection 208.3.05.B.2.d, construct the embankments in parallel layers. Deposit the material and spread in horizontal layers not more than 8 in (200 mm) thick, loose measurement, for the full width of the cross-section. Use motor graders, bulldozers, or other approved equipment to keep layers uniform. Compact the layers using a sheepsfoot roller. The Engineer may permit the use of vibratory rollers whenever the embankment soils consist of Class IA1, IA2, or IA3 materials.

b. Moisture Content

Compact each layer within the range of optimum moisture content to achieve the compaction specified below.

Do not construct successive layers on previous layers that exhibit excessive pumping under construction equipment regardless of compaction.

Dry material if it contains too much moisture. Ensure the moisture content is sufficient for stability and compaction.

Add water if the material is too dry and uniformly mix it with the soil for stability and compaction. The Department will not measure water added to the material under this requirement for payment. It is considered incidental to the satisfactory completion of the work.

c. Degree of Compaction

Compact the embankment at bridge structures to at least 100 percent of the maximum laboratory dry density. Compact for the full depth of the embankment, beginning at the toe of the slope and extending 100 ft (30 m) from the end of the bridge.

Compact embankment other than at bridge structures to at least 95 percent of the maximum laboratory dry density to within 1 ft (300 mm) of the top of the embankment. Compact the top 1 ft (300 mm) of the embankment to at least 100 percent of the maximum laboratory dry density.

If grading and paving are let in separate contracts, the paving Contractor shall recompact the top 6 in (150 mm) to at least 100 percent of the maximum laboratory density.

The maximum laboratory dry density will be determined from representative samples of the compacted material using GDT 7, GDT 24a, GDT 24b, or GDT 67, whichever applies. The in-place density of the compacted fill will be determined according to GDT 20, GDT 21, or GDT 59, whichever is applicable.

d. Special Conditions

Follow these special requirements:

1) Build layers as parallel as possible. In certain cases the Engineer may permit steeper slopes at ends of the embankments.

2) In swamp or inundated areas that will not support the equipment, build the lower part of the fill by dumping successive loads in layers no thicker than necessary to support the hauling equipment.

3) Build and compact the remainder of fills in layers as specified above.

e. Embankments at Structures

Use Class I or II material when constructing embankments over and around pipes, culverts, arches, and bridges according to Subsection 810.2.01.A.1.

1) Compact the material as specified in Subsection 208.3.05.B.2.c.

2) Place the specified material on both sides of bridge structures for a distance of at least 10 ft (3 m).

NOTE: Do not place rock larger than 4 in (100 mm) diameter within 2 ft (600 mm) of any drainage structure.

Before any traffic is allowed over any structure, provide a sufficient depth of material over and around the structure to protect it from damage or displacement.

f. Method of Handling Classes of Soils

Handle the different classes of soils using the following methods:

1) Class IIB3and Better Soils

Distribute and compact these soils in 8 in (200 mm) uniform layers over the entire width of the embankment. Use these soils (when available in sufficient quantities) in the top 1 ft (300 mm) of the roadbed. Reserve these soils for this purpose when directed by the Engineer.

2) Class IIB4 Soils

Distribute and compact these soils in 8 in (200 mm) layers over the entire width of the embankment.

3) Class III Soils

Do not use these soils in embankments except when directed in the Plans or ordered by the Engineer. If directed, place them in the same manner as Class IIB4 soils.

Class IIIC4, chert clay soils in District 6 with less than 55 percent passing the No. 10 (2 mm) sieve may be used for subgrade.

4) Class IV Soils

Do not use these soils in embankments. Waste these soils or (when designated in the Plans or directed by the Engineer) stockpile them and use them for blanketing fill slopes.

5) Class V Soils

Place these soils in the same manner as Class IIB4 soils. Pulverize large particles to obtain the proper compaction.

6) Class VI Rock

Place rock in uniform layers not over 3 ft (1 m) thick and distribute it over the embankments to avoid pockets. Fill voids with finer material.

Do not place rock larger than 6 in (150 mm) in diameter within 3 ft (1 m) of the finished surface of the embankment.

Do not place rock larger than 6 in (150 mm) in diameter within 2 ft (600 mm) of the outer limits of proposed posts or utility poles.

Do not place rock at bridge end bents within 10 ft (3 m) of pile locations.

7) All Classes

Place mixtures of the above classes together with random material such as rock, gravel, sand, cinders, slag, and broken-up pavement so that coarse particles are dumped near the outer slopes and finer particles near the center of the roadway.

Produce a gradual transition from the center to the outside. If material is too large to place in 8 in (200 mm) layers, treat it as rock or break it down and place it in 8 in (200 mm) layers.

3. Embankment Consolidation at Bridge Ends

When consolidating embankments at bridge ends, use the following specifications:

a. When a waiting period is required in the Plans or by Special Provision, place end fills at bridges in time for consolidation readings to indicate that both the fill and the natural ground have reached the desired degree of stability.

b. Delay constructing bridge portions during the period of consolidation as shown on the Plans or as required by a Special Provision.

The Plans or the Special Provisions will indicate the estimated time required to reach consolidation.

The Engineer may extend or shorten this waiting period based on settlement readings taken on points placed in the fills. The longer or shorter waiting period will not constitute a valid claim for additional compensation.

Follow these specifications when extending a waiting period:

1) Extending an estimated waiting period may lead to increasing the Contract time. If the Contract is on a calendar day or completion date basis, the Department may increase the calendar days equal to the maximum number of calendar days involved in the extension.

2) When a time extension causes additional delay due to seasonal changes, the Engineer may recompute the time extension on an available day basis.

When the Contract is on an available day basis, the time increase will be equal to the greatest number of available days involved in the extension.

3) When time charges on separate Bridge Contracts are controlled by Special Provisions that set forth the availability of bridge sites, extending an estimated waiting period controls the availability of that bridge site only; time charges will be adjusted according to the Special Provision.

c. Construct the embankment at bridge ends full-depth to the subgrade template (except for the stage construction providing a bench for the end bent) unless otherwise stated in the Plans and compact thoroughly before driving a piling at bridge ends.

The minimum acceptable length of completed full-depth embankment is equal to the maximum width of fill between slope stakes at the end of the bridge. The Department will measure the minimum length of full-depth embankment along the roadway centerline away from the end-of-bridge Station.

C. In-Place Embankment

Construct embankments designated on the Plans and in the Proposal as “In-Place Embankment” using either a hydraulic or conventional dry land construction method and using materials obtained from within the construction limits of the Right-of -Way or from borrow pits, whichever is appropriate.

Regardless of the method of construction, the Department will measure the entire embankment for payment as in-place embankment.

1. Construction

   - Build embankments according to this Section when hydraulic or conventional dry land construction methods are used.
   - Furnish equipment suitable for the method chosen to complete the work. Equipment is subject to the Engineer's approval.
   - When using a hydraulic method is used, conform to these additional requirements:
     a. Using baffles for construction is permitted as long as the embankment slopes are not steeper than indicated on the Plans.
     b. Use of excess material placed outside the prescribed slopes to raise the fill is permitted.
     c. Leave openings in the embankments at the bridge site as indicated on the Plans.

        Dredge material that invades the openings or existing channels at no additional expense to the Department. Provide the same depth of channel at mean low water as existed before the construction of the embankment.
     d. Do not excavate or dredge material within 500 ft (150 m) of the toe of the embankment or existing structures, unless otherwise shown on the Plans.
     e. Place in-place embankment in areas previously excavated below the ground line in a uniform mass beginning at one end of the excavated area and continuing to the other end of the operation. Avoid forming of muck cores in the embankment.
     f. Construct the embankment at the farthest points along the roadway from the bridge ends and progress to the end of the excavation area beyond the toe of the slope of endrolls at bridge ends.
     g. Remove timber used for temporary bulkheads or baffles from the embankment.
     h. Fill and thoroughly compact the holes.

2. Maintenance

   a. Maintain the embankment at grade until it has been completed and accepted. Assume responsibility for slides, washouts, settlement, subsidence, or mishaps to the work while under construction.
   b. Keep constructed embankment stable and replace displaced portions before Final Acceptance of the entire Contract.
   c. Remove and dispose of excess materials, including fill, detours, and erosion deposits placed outside the prescribed slopes in wetland areas.

3. Permits

   Obtain (at no additional expense to the Department) necessary permits or licenses from the appropriate authorities to operate dredges and other floating equipment in waters under their jurisdiction, unless otherwise provided for in the Contract.

4. Erosion Control

In addition to the provisions of Section 161, follow additional erosion, siltation, and pollution control measures specified in the Plans or Special Provisions.

D. Rock Embankment

This work includes furnishing materials either from the roadway excavation or other sources and hauling and the placing of rock embankment. Use materials that meet the requirements of Subsection 208.2.B, as shown on the Plans or directed by the Engineer.

1. Place the rock in uniform layers not over 3 ft (1 m) thick. Distribute rock over the embankment to avoid pockets.
2. Fill voids with rock fines. Do not use rock larger than 6 in (150 mm) for any diameter within 3 ft (1 m) of the finished grade of the embankment, or within 2 ft (600 m) of any structure.
3. Do not place rock at bridge end bents within 10 ft (3 m) of pile locations. Construct rock embankment and adjoining earth embankment concurrently. Ensure that neither is larger than 4 ft (1.2 m) higher than the other at any time.

E. Final Finishing

After constructing the entire embankment, shape the surface of the roadbed and the slopes to reasonably true grade and cross-sections as shown on the Plans or established by the Engineer.

Open ditches, channels, and drainage structures (both existing and those constructed or extended) to effectively drain the roadway. Maintain the embankment areas until Final Acceptance of the Project.

208.3.06 Quality Acceptance

General Provisions 101 through 150.

208.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

208.4 Measurement

The following section details measurement for payment for the work described in this Section:

A. Except as provided herein, there will be no measurement for payment for the work covered by this Section.

B. The Department will compute the quantity of in-place embankment or rock embankment using the average end area method, or other acceptable methods, when embankment is in place and accepted.

The quantity will be calculated as the neat volume, above the original ground surface, between the template line shown on the Plans or authorized changes by the Engineer, and the original ground surface.

The original ground surface is determined by conventional field, photogrammetric, or other methods. The Department will not deduct for the volume of culverts and manholes.

In-place embankment necessary for the construction of temporary detours will not be measured for payment and is considered incidental to the completion of the work unless specifically stated otherwise on the Plans.

Where work includes excavating of unstable materials below the ground line, the volume of embankment required for backfill below the ground line is calculated based on the neat line measurement for the cross-

section shown on the Plans or established by the Engineer by the average end area method or other acceptable methods.

Where permitted by the Engineer or required by the Plans, material removed from the existing roadbed, special ditches, berm ditches, or dry land borrow pits and used in making embankment will be paid for as in-place embankment regardless of the method of excavation.

208.4.01 Limits

General Provisions 101 through 150.

208.5 Payment

Except as provided for herein, the Department will not make separate payment for placing embankments, backfilling structures, and constructing earth berms, including surcharges.

Payment will be included at the Contract Unit Price for the items covered by Section 204, Section 205, and Section 206. Prices are full compensation for The Work covered by this Section.

The Unit Prices bid per cubic yard (meter) for in-place and rock embankments (when included as Contract bid Items) are full compensation for furnishing suitable material, hauling, placing, compacting, finishing, and dressing according to these Specifications or as directed by the Engineer.

Payment will be made under:

Item No. 208	In-place embankment	Per cubic yard (meter)
Item No. 208	Rock embankment	Per cubic yard (meter)

208.5.01 Adjustments

General Provisions 101 through 150.